

Gender role and participation in mandarin postharvest practices in Nepal

Yogendra Acharya^{*1}, Sudha Sapkota²

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Author Affiliation:

¹Planning Division, Nepal Agricultural Research Council, Singhdurbar Plaza, Nepal

²Monitoring and Evaluation Division, Nepal Agricultural Research Council, Singhdurbar Plaza, Nepal

*Corresponding Author:

Planning Division, Nepal Agricultural Research Council, Singhdurbar Plaza, Nepal

Email: yogendraacharya9@gmail.com

Orcid id: 0000-0002-2447-5217

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ABSTRACT

This study was conducted to assess gender role and participation in mandarin postharvest activities in Nepal. Two districts under Gandaki province, Tanahun and Syangja were selected for study purpose. A total of 90 Mandarin farmers, 45 from each district were selected using simple random method of sampling. Semi-structured pre-tested interview schedule was used for primary data collection. Two focus group discussions and field observation of mandarin orchard was carried out. Data were analyzed by using both descriptive and inferential statistics. This paper explored the gender involvement in four major postharvest activities of mandarin farming. The findings indicated that female participation was higher in mandarin grading (43.3%) followed by mandarin packaging (22.2%), mandarin marketing (16.7%) and mandarin harvesting (15.6%). Similarly, it was noticed that male participation was more (59.9%) in marketing operation than others. Likewise, study showed that among female respondents only 28% female were acquainted with post-harvest related information while awareness among males was 49%. Furthermore, it was also observed that male dominates female in terms of wage rate in mandarin post-harvest activities which was primarily due to social context, accessibility and out migration situation. To make an impact to increase gender role and participation in mandarin postharvest operation, concerned program and organization need to consider gender dimension (unbiasedness, awareness, personal behaviour) and post-harvest knowledge associated with it ensuring female farmers can be better empowered in reducing postharvest loss.

Keywords: gender, mandarin, post-harvest

1. INTRODUCTION

Mandarin orange (*Citrus reticulata* Blanco) belonging to the family Rutaceae is one of the most important and highly commercial citrus fruit of Nepal (Bhattarai and Shah, 2017). It is widely grown in the mid hills region of Nepal covering total area of 27002 hectare with total production of 198406 MT in 2020/2021 (MoALD, 2022). Mandarin play a significant role in national economy contributing 0.88 percent share in agricultural gross domestic products (AGDP) (MoALD, 2021). Mandarin cultivation contributes to income earning, employment generation, and expanding food availability and nutrition in the citrus-growing hilly areas of Nepal.

Although mandarin is grown widely across hilly region, postharvest management issues have been considered as the key factor for major losses of mandarin fruit during harvesting, handling and marketing. In Nepal, The total losses from farm to retail level was estimated from 15-20 percent (Bhattarai, 2018). Reducing postharvest losses, especially in developing country like Nepal, could be a sustainable solution to increase fruit availability, reducing the cost of cultivation and ultimately improving farmers' livelihood. At the global level, women smallholder farmers are responsible for multiple postharvest activities such as harvesting, threshing, cleaning, processing and marketing (Jones et al 2020). At the same time women farmers are compelled to handle daily household chores causing limited access to information to learn new technologies and weak participation in decision-making process.

In the case of gender's role and participation in fruit production, there exist several issues related to production and postharvest practices. Both male and female possess different level of knowledge and capacity to perform farm work in different ways. Due to socio-cultural norms and male-dominated societal structure, men are expected to carry out farm activities that involve decision taking task and most commonly those works which require more physical strength. Unlike this, female are more likely expected to do manual and repetitive works which do not require more physical strength but encounter lot of drudgery (Tripathi et al. 2016). Although male and female play significant role in fruit production the extent of female labor participation is higher in case of fruits' postharvest operation. Proper utilization of post-harvest management technologies can help to improve the quantity and quality of harvested fruits, increasing the amount of sell quantity and better selling price. However, despite women farmers' active involvement in post-harvest activities, their roles are undermined and they face barriers to technology adoption. Hence this study assessed the gender's role and participation in postharvest activities of mandarin farmers specifically their engagement in harvesting, grading, packaging and marketing operation.

2. METHODOLOGY

Study Sites, samplings and data collection

This study was conducted in two districts of Gandaki province, namely Tanahun and Syangja. Among 11 districts under Gandaki province, nine districts have record of mandarin cultivation except for Manang and Mustang districts. The two districts with higher area under mandarin cultivation were purposively selected for the study purpose (MoALD, 2020). In consultation with the citrus superzone program and Agriculture knowledge center (AKC) of the respective district, two sites from each district were identified. Mygde and Shuklagandaki rural municipalities of Tanahun and Putalibazar and Arjunchaupari Municipalities of Syangja were selected for study purpose.

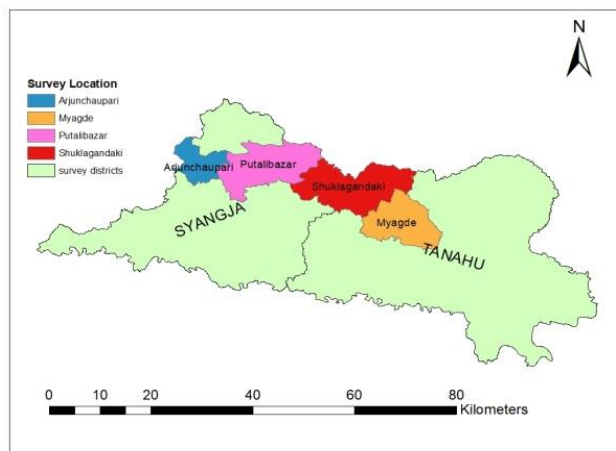


Figure 1: Map showing two study districts and four sites.

From those identified sites, 90 mandarin farmers were selected using a simple random sampling technique. Pretested interview schedule was administered to collect primary data from selected farmers. Also, two focus group discussions were organized to acquire additional information and its validation.

Secondary information and data analysis

Secondary information was obtained from Mandarin-related publications, government reports, and relevant scientific papers. Data obtained from the household survey were managed and analyzed by using Statistical Package for Social Science (SPSS) and

Microsoft excel package. Socio-demographic characters, mandarin production, gender role and participation in post-harvest practices were analyzed by using descriptive tools such as frequencies, percentage and mean as per need.

3. RESULTS AND DISCUSSION

Descriptive statistics of variable

The result showed more than two third of the respondents (80%) were male while 20% were female with a mean age of 52 years. The average education status of the respondent was 7 school years. The farming society was dominated by Brahmin/Chhetri (56%) followed by indigenous communities (20%) and Dalit (14%). Labor force out-migration of the economically active population is not new phenomenon in Nepal. The data on migration status of farming household depicted that 43% of households have at least one member gone for foreign country for employment opportunity. Farmers in the study area had long been involved in mandarin farming with 19 years of experience in an average. Similarly, the study reported that the average cultivated land area per household was 0.64 ha while the area allocated for mandarin farming was 0.43 ha per household. The average number of mandarin plants in the orchard was found to be 294 plants which includes both fruiting and non-fruiting type. Furthermore, the study indicated that in an average, mandarin farmers were earning a profit of 50 thousand per year by selling mandarin.

Distribution of mandarin farming experience and education by gender

Farmer's education and farming experience are important factor that helps farmer to adopt improved farming practices. The result in the study area showed that female farmers were less educated than male farmers. The average school years that male had completed was 7.5 while it was just 4.7 school years for female. Similarly, it was found that male farmers were more experienced in farming occupation than female.

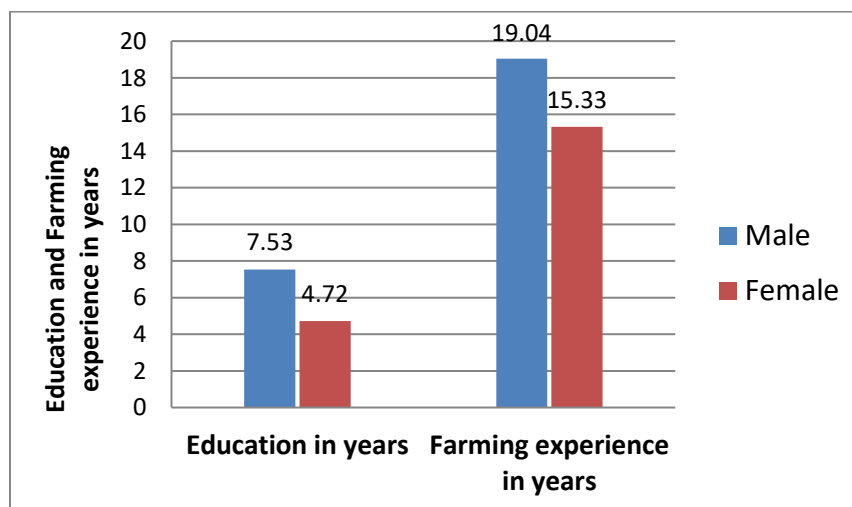


Figure 2. Education and mandarin farming experience of male and female farmers.

Farmer's knowledge on the mandarin post-harvest operation.

As post-harvest losses are a significant problem, the farmer's knowledge in this matter is critical in reducing post-harvest losses. Farmers can apply their knowledge in post-harvest loss management activities which ultimately helps to increase its effectiveness. The result indicated that only 44.4 % of mandarin farmers were familiar with post-harvest-related knowledge. Further, the knowledge among gender class showed that among female farmers, only 28% of them were aware of post-harvest related knowledge.

Table 1. Farmer's knowledge on the mandarin post-harvest operation.

Gender	Farmer's knowledge on mandarin post-harvest operation		Total
	No	Yes	
Female	13 (72.2)	5 (27.8)	18 (100)
Male	37 (51.4)	35 (48.6)	72 (100)

Total	50 (55.55)	40 (44.44)	90
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Figure in parenthesis indicates percentage

Source: Field survey 2020.

Involvement in mandarin harvesting by gender

The post-harvest management of mandarin fruit begins with fruit picking. The way we pick the fruit determines the quality of fruit after harvest from trees. Most often, smooth picking may cause less damage to trees and fruits themselves. Hand-picking was observed to be a popular way of fruit harvesting in all study areas. The data regarding involvement in mandarin harvesting depicted that around 44% of households practiced mandarin harvesting by involving both male and female farmers. While only 16% of farming households engaged their female member of the household in harvesting operations. As harvesting marks an important initial step of post-harvest management, the appropriate decision taken by farmers could enhance the quality of mandarin fruits. Therefore, the knowledge of involved farmers in harvesting operation help them to take appropriate decision and that decision includes which fruits to pick, how to pick, what time to pick and where to store just after picking etc.

Table 2. Farmer's involvement in the mandarin harvesting operation by gender

District	Involvement_in_Mandarin_harvesting operation			Total	Chi-Square
	Male	Female	Both		
Syangja	31.1%	15.6%	53.3%	100%	3.378
Tanahun	48.9%	15.6%	35.6%	100%	
Total	40.0%	15.6%	44.4%	100%	

Figure in parenthesis indicates percentage

Source: Field survey 2020.

Involvement in mandarin grading by gender

Grading of mandarin fruits is another important post-harvest management operation. Grading involves selecting of mandarin fruits based on desirable characteristics. Mandarin farmers mostly perform grading operations based on size and color of mandarin fruits. The grading step is crucial for preparing the mandarin for the market so that quality fruits are separated to fetch a higher price. Also, the study result depicted that manual grading was only option for most of the farmers. The information regarding who was mainly engaged in grading operation, indicated that grading task is done by female (43.4%) as reported by respondent farmers. Although the grading task requires attention and knowledge on grading attributes, it is considered as quite easier and non-tedious task. Therefore the majority of farming households prefer their female member for mandarin grading. Also, discrimination in wage rate between male and female labor was reported, female labor was usually paid less than male. Due to differences in wages, mandarin farmers with the large volume of mandarin tend to use female labor for grading operation. Which, on the other hand has positive implications for women/girls to get seasonal job opportunity to some extent, mostly offered by commercial farmers. Similarly, following the task, 41% of respondent households agreed that grading is done by both male and female members in the study areas. Apart from this, grading task was considered as masculine task by only 15.6% households.

Table 3. Farmer's involvement in the mandarin grading by gender

District	Involvement in Mandarin grading			Total	Chi-Square
	Male	Female	Both		
Syangja	26.7%	31.1%	42.2%	100%	10.272***
Tanahun	4.4%	55.6%	40.0%	100%	
Total	15.6%	43.3%	41.1%	100%	

*** 1% level of significance

Source: Field survey 2020.

3.6 Involvement in mandarin packaging by gender

Packaging is the most important operation to maintain the quality of mandarin (Pokhrel, 2011). The shelf life, weight loss, and pathological disorders of mandarin are greatly linked with packaging operation and materials used for it. The report revealed that the packaging operation was done by both male and female in 56.7% of the respondent households. Likewise, men were solely responsible for this task on the farm of 21.1% of the respondent households in the study area. Also, only 22.2% of farm households agreed that women are responsible for doing packaging operation of mandarin. Almost in all farming households, packaging

operation of mandarin was associated with collecting the graded mandarin in plastic create, jute sack, bamboo bucket (*doko*). Plastic crate use was highly popular among mandarin farmers. Almost 98% farmers had adopted plastic crate as a means for mandarin packaging. The types of packaging materials use greatly determine the extent of damage during subsequent handling, storage and transportation. Apart, still some of farmers are forced to use local bamboo bucket and even jute sacks due to unavailability of plastic create.

Table 4. Farmer's involvement in the mandarin packaging operation by gender

District	Involvement in Mandarin packaging			Total	Chi-Square
	Male	Female	Both		
Syangja	24.4%	15.6%	60.0%	100%	2.450
Tanahun	17.8%	28.9%	53.3%	100%	
Total	21.1%	22.2%	56.7%	100%	

Source: Field survey 2020.

Involvement in mandarin marketing by gender

Marketing is a major function after fruit harvest, it is the process of transferring farm commodities from farm gate to consumers. The farmer who takes responsibility for the marketing of mandarin has direct access to farm income. Therefore, the decision regarding who is responsible for marketing has important economic and social implications. The respondent household reported that mandarin marketing is mainly done by men in over 60% of surveyed households. Women marketing mandarin usually sell small quantities of produce in the local retail market. Likewise, some women sell their mandarin at the nearby open marketplace while some take their mandarin to nearby roads and start selling it as roadside street vendors. The study result showed that only 16.7% of respondent household considered it to be the sole responsibility of women to perform marketing of mandarin. Similarly, in almost 25% of mandarin farming households, it is both men's and women's job to decide upon mandarin marketing. In the case of male out-migrated households, women must also decide overall postharvest activities including whom to sell, where to sell with price negotiation with traders and contractors. An efficient marketing strategy plays crucial role in getting better prices to the farmers. Therefore, it becomes important that farmers engaged in marketing mandarin must be careful enough while making a decision so that farmer can sell their farm produce in better price conditions.

Table 5. Farmer's involvement in the mandarin marketing by gender

District	Involvement in Mandarin marketing			Total	Chi-Square
	Male	Female	Both		
Syangja	68.9%	4.4%	26.7%	100.0%	9.777***
Tanahun	48.9%	28.9%	22.2%	100.0%	
Total	58.9%	16.7%	24.4%	100.0%	

*** 1% level of significance

Source: Field survey 2020.

4. CONCLUSION AND RECOMMENDATION

This paper assessed the gender's role and participation in the mandarin post-harvest operation in Nepal. Although post-harvest losses are considered a worldwide problem, it has a greater impact in developing countries like Nepal. Poor post-harvest management of fruits and vegetables has contributed to poor-quality diets and poor nutrition outcomes in many low and middle-income countries. While women often play a crucial role in many post-harvest operations and gender roles and participation in such operations might have relations that help shaping the decision-making process related to post-harvest loss and post-harvest loss reduction technologies. The overall management of mandarin fruits after harvest requires the coordinated effort of all family members. However, due to lower access to information and resources, women's role and overall performance might be compromised in post-harvest loss reduction activities. According to the results, female farmers were playing an active role in all mandarin post-harvest operations. Their involvement in mandarin grading was higher as compared to mandarin packaging and harvesting operations. However in terms of wage rate, there exist wage rate discrimination among male and female labor. Although post-harvest losses are recognized as major problem, farmers' knowledge in this issue was found low, more than half of farming households were still not fully aware of post-harvest knowledge. Similarly, data on marketing responsibility within mandarin farming household indicated the male domination in marketing operations. Strengthening women's ability to access and benefit

from post-harvest loss technologies could have the advantage not only for reducing food loss but also for improving household nutrition. Since women's role and participation exists throughout the whole process, it is important to consider their needs, preferences, constraints and interrelationship for effectively incorporating gender issues in program intervention. As post-harvest loss and gender issues are highly context-specific, comprehensive information plays a pivotal role in program design. To overcome the challenges associated with mandarin post-harvest operations and gender issue, concerned program and organizations need to incorporate gender issues and dynamics (unbiasedness, awareness, personal behavior) in program intervention ensuring that female farmers can be better empowered for reducing mandarin post-harvest loss.

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Ethical approval

Not applicable.

Informed consent

Not applicable.

Conflicts of interests

The authors declare that there are no conflicts of interests.

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Data and materials availability

All data associated with this study are present in the paper.

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